

FORUM

The Sum Is Greater Than the Parts

Consumption of fish and seafood is increasing, and half of the seafood produced worldwide comes from aquaculture. Catfish production is the largest sector of aquaculture in the United States, and the Agricultural Research Service is working on new advances as well as building on past gains.

The challenges addressed by aquaculture research, like all research, are multifaceted and complex. The organisms, production systems, environment, cost of inputs, and value of outputs are all changing dynamically. Oftentimes, out of necessity, research will focus on one piece of a large system or one new technology, like the disease resistance and susceptibility of a new hybrid catfish. Simultaneously, other scientists will be working on a different piece, such as improving oxygen-management systems.

Generally, no single technology by itself will transform an industry. Instead, a series of improvements is needed, each of which takes time in development and in extension and transfer. Benefits will accumulate as farmers adopt the new technology—a process estimated to take 15 to 30 years.

The catfish industry has been beset by many of the same troubles seen in other animal-production industries. The high price of feed and fuel has driven up production costs. One factor the catfish industry has to deal with, which is less severe for those in the poultry, beef, or swine industries, is the easy substitution of catfish with other white-fleshed fish, such as tilapia. When the price of beef goes up, people eat less beef; but when they do buy beef, it is generally beef that was produced in the United States. On the other hand, if the cost of catfish goes up, consumers may look to similar products, often produced outside the United States, that can fill the same niche at a lower price. This has made the factors affecting the cost of catfish production especially critical.

Advances in Catfish Research

In this issue, you will read about advances in producing farm-raised catfish. The research by ARS, Mississippi State University and other university partners, and industry scientists has been uniquely collaborative, leading to innovations that could potentially double the historical levels of production from 4,000 pounds per acre to more than 8,000 pounds. Production of a new hybrid catfish (blue catfish male by channel catfish female) has increased dramatically, from 30 million fry in 2007 to more than 150 million in 2012, and it will likely exceed 175 million in 2013. New aeration strategies have resulted in improved feeding and better conversion of feed into fillet. These cumulative advances result in shorter production cycles, improved rates of survival, and higher profitability. (See story on page 4.)

As the interest in hybrid production grows, ARS scientists at our Stoneville, Mississippi, location are making inroads into genetic improvements, discovering better methods of hybrid juvenile production, and enhancing pond systems—research that will help farmers deliver high-quality catfish to meet consumer demand.

Catfish strains are regularly evaluated to help farmers and processors improve traits and increase profits. ARS scientists are identifying the best blue males and channel females to produce hybrid offspring with superior growth and fillet yield. They also investigate whether the performance of purebred channel catfish offspring is predictive of the best female parents for hybrid production. This information will benefit producers as they develop breeding plans to improve catfish performance.

Channel catfish have been well characterized for several decades, but there is less

data on blue catfish production traits and blue-by-channel hybrid catfish offspring. Research at Stoneville will determine the effects of blue catfish strains and individuals within strains on hybrid offspring growth and fillet yield.

Several scientific advances are being developed and incorporated into catfish farming. ARS scientists developed a set of molecular markers for DNA fingerprinting to efficiently identify catfish species and parentage. They tested the markers on different populations and were able to identify the parents of offspring collected over 3 years and attribute all individuals to specific crosses. This accuracy allows for greater and faster genetic gains in performance.

Strategies for progress also include selective breeding to improve disease resistance, enhancing vaccine treatment to protect against pathogens, and developing better pond-management systems and equipment. As soon as they are available and tested, these improvements are passed on to farmers.

ARS remains committed to delivering relevant, high-quality research that benefits the aquaculture industry. This includes working with the U.S. catfish industry to develop the tools and technology it needs to improve productivity, efficiency, and quality so that it may rebound and thrive. The work of ARS scientists and collaborators has provided new knowledge and technology that is contributing to a renewed domestic catfish industry.

Jeff Silverstein

ARS National Program Leader
Aquaculture
Beltsville, Maryland